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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE

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PUBLIC HEALTH

Smallpox Problem Remains

► THE HEALTH FORCES of the world are determined to eliminate smallpox from the globe some 165 years after the English practitioner Edward Jenner discovered a vaccination.

The 14th World Health Assembly, annual meeting of the governing body of the World Health Organization in New Delhi, India, also tackled the new threat of ionizing radiation, as well as the stubborn problems of such other old diseases as yaws, malaria, schistosomiasis, cholera and typhus.

"As long as smallpox survives in a single country," Dr. M. G. Candau, director-general of WHO, said, "it constitutes a danger for all." He termed smallpox "a complete anachronism."

In India, where smallpox is most prevalent, the Indian Government authorized spending \$700,000 on 16 pilot projects in 16 states. The all-India eradication cam-

paign will be launched on the basis of the experience gained in these pilot projects, and is expected to cost the Indian Government some \$14,000,000.

Sixteen countries in Africa reported cases of smallpox in January. Brazil and Ecuador also reported smallpox cases for that month.

During a ten-year period, however, smallpox cases reported in the Americas dropped to one-fourth the previous rate. National campaigns of vaccination are showing steady progress against the disease. Although exact figures are not available, World Health authorities say there has been a decrease from 72,000 cases of smallpox reported in 1959.

Recent advances in tuberculosis control are being discussed, as are radiation control programs and the health hazards of nuclear-powered merchant marine ships.

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MEDICINE

Enzyme Dissolves Clots

► A WEAPON against blood clots that have been formed and threaten death may have been found after a seven-year study by Dr. Eugene E. Clifton of Cornell University Medical College in New York.

Dr. Clifton has succeeded in isolating an enzyme, fibrinolysin, which is found in human blood, and ordinarily is sufficient to dissolve the small clots readily formed but harmless.

Other scientists have developed a drug that prevents the formation of blood clots and this drug was administered to President Eisenhower in treatment of his coronary ailment. However, this is an anticoagulant that is not effective against a clot that already has been formed.

Although Dr. Clifton and his associates have administered injections of fibrinolysin

to only 45 men and women suffering from critical heart ailments, 39 survived. The six who died were in a state of shock or hopeless heart condition.

It is hoped fibrinolysin will be helpful in other ailments besides heart conditions that involve blood clots. Among these are phlebitis, an inflammation of a vein, such as young mothers sometimes develop as "milk leg" after delivery.

Dr. Clifton said injections of fibrinolysin will usually be given only in an emergency and that, although the enzyme may save many lives, it will not always be successful. The National Science Foundation and other foundations made the research on fibrinolysin possible through grants.

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MEDICINE

Asian Flu Danger Seen

► WITH APPROXIMATELY 1,500 deaths in the British Isles from Asian flu during January, there is danger of infection through carriers to the United States.

Schools have closed in Tokyo because of influenza this winter—25 of them have presently suspended classes following 13 deaths from flu this year. American Samoa and the Caroline Islands have reported influenza-like diseases.

Dr. Joseph A. Bell of the Laboratory of Infectious Diseases at the National Institutes of Health said the U.S. has been lucky so far.

"But this is only February," he said. "Feb-

ruary and March are the dangerous months here."

No practical way of preventing carriers from spreading the disease among susceptible people has been found, Dr. Bell said. "Vaccination is the safest preventive," he advised. "Don't wait for an epidemic. Even one dose of vaccine is fairly effective in adults, although we usually recommend two shots four weeks apart."

The U. S. Public Health Service Communicable Disease Center in Atlanta reported no outbreaks of influenza in this country through January, 1961. Pneumonia and influenza deaths are almost normal for this time of year.

There were almost 60,000 excess deaths here in a six-month period from October, 1957, to March, 1958. The 1960 epidemic caused an excess of more than 26,000 deaths.

In view of the A-2 strain influenza during the first three months of 1960, CDC said, it is not expected that type A influenza will occur this year in the form of a nation-wide epidemic. But localized outbreaks of either influenza A or B may occur this winter. Type A-2 is Asian flu.

The Public Health Service has encouraged routine annual immunization against influenza.

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MEDICINE

Blood Enzyme Test Shows Liver Damage

► A BLOOD ENZYME test has been devised for liver damage.

Drs. R. J. Wieme and Y. Van Maerde of the University of Ghent, Belgium, reported to a New York Academy of Sciences conference that they used a method of general application they called "enzymoelectrophoresis." The enzymes are revealed by spectrophotometric techniques applied directly to the medium used in the electrophoretic separation. (Electrophoresis involves the separation of charged particles by an electric field.)

The researchers said the one outstanding attribute of their test is specificity.

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PHYSIOLOGY

Sensitivity to Pain Rises When Senses Are Inactive

► SENSITIVITY TO PAIN apparently increases as the other sense organs are deprived of stimulation.

This conclusion was reached by Dr. Jack A. Vernon of Princeton University and Dr. Thomas E. McGill of Williams College after a study of the effects of sensory deprivation upon the skin's pain threshold.

The 18 male subjects for the study first underwent tests to make sure they had stable pain thresholds. The pain sensations were caused by charges of electrical current administered through electrodes clamped to the right ear lobe.

After the preliminary testing, nine were confined, one at a time, for four days in a soundproof and totally dark cubicle containing only a single bed upon which the subject lay.

At the end of the four-day confinement, his pain threshold again was tested. Without exception, the men who had been confined showed a lowered pain threshold and an increase in sensitivity. The other nine, who had followed usual routines during the four days, showed no appreciable change.

Drs. Vernon and McGill report in *Science*, 133:330, 1961, that as the other senses are deprived, the brain has less work to do. Hence, when pain sensations are applied, the resulting neural impulses encounter less opposition, and the pain is sensed at a lower threshold.

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GEOPHYSICS

Equator Is Egg-Shaped

The earth's equatorial diameter is 1,400 feet longer when measured from certain points on the surface, an astronomer has found from satellite tracking camera photographs.

► THE EARTH'S EQUATOR is egg-shaped, not circular, an astronomer has found.

Imre G. Izsak, astronomer at the Smithsonian Astrophysical Observatory, Cambridge, Mass., used high precision photographs taken by the Baker-Nunn satellite tracking cameras to discover that the equator is elliptical.

He determined the equatorial diameter is about 1,400 feet longer from a point in the Atlantic just off the eastern tip of Brazil across to a point near the Admiralty Islands above eastern Australia than the diameter from a point on the equator below Southern California across to a point below Iran.

Mr. Izsak presented his findings to the Ohio State University symposium on Geodesy in the Space Age in Columbus, Ohio. He said the movements of satellites are affected by the elliptical shape of the equator.

Geophysicists have long suspected the equator was not circular because certain

patterns in the gravitational field indicate the elliptical shape. It was not, however, until the Baker-Nunn cameras produced satellite photographs accurate to about 1/1000 of a second in time and two seconds of arc in angular distance that the suspected effect of the shape of the equator could be proved.

The present determination is preliminary and is being refined.

The Smithsonian has 12 satellite tracking stations scattered around the world. Two are in the U.S., one in Hawaii, Curacao in the West Indies, Argentina, Peru, Spain, South Africa, Iran, India, Japan and Australia.

Mr. Izsak said photographs of the satellites Vanguard I and II were used to determine the elliptical equator. There is as yet no theory as to why the equator is egg-shaped, and the problem puzzles geophysicists.

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PHYSIOLOGY

Nature's Clocks Unaffected

► AN EXPERIMENT conducted at two South Pole stations apparently has dispelled the notion that the earth's rotation controls the biological "clocks" of plants and animals.

Dr. Karl C. Hamner, University of California at Los Angeles botanist, and two assistants showed that modifying the influence of the earth's rotation on bean plants, hamsters, fungi and fruit flies failed to alter their inner rhythms.

The experiments were aimed at clarifying the workings of the "biological clock," the system whereby plants and animals function with almost clock-like regularity. For instance, some plants fold their leaves at night and open them by day. Birds know when to migrate and bears know when to hibernate. Even man shows rhythm in his sleep cycle, and in daily variations of body temperature and blood sugar levels.

Scientists are trying to determine if this is controlled by metabolic changes within the individual organisms or by external factors such as temperature, atmospheric pressure, gravity, cosmic rays, the earth's magnetic field or rotation.

In investigating the latter, Dr. Hamner and Drs. Gir Raj Sirohi and Takashi Hoshizaki selected the U.S. South Pole and the McMurdo Sound stations because of their closeness to the earth's axis of spin.

The experiments were conducted in total

darkness on clock-driven, rotating turntables which could be run either counter to or with the direction of the earth's rotation.

Some turntables were set at time periods of less than 24 hours, others of more than 24 hours, and still others were rotated at 24-hour periods in a direction counter to the earth's rotation. The control turntables were stationary.

The hamsters, plants and other organisms all failed to show any loss of rhythm during the ten-day rotation period.

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BIOLOGY

Texan Offers Kinder Way to Kill Crabs

► YES, IT DOES HURT the live crab or lobster when it is dunked in a pot of boiling water.

Yes, there is a kinder way to kill the tasty crustaceans.

Dr. Gordon Gunter of the Texas Game and Fish Commission sharply criticized the present methods of scalding live crabs and lobsters to death, and suggested a painless process as a more civilized substitute.

Place the live crab or lobster in a pot of cool, fresh water and slowly heat it to a lukewarm 104 degrees Fahrenheit.

The fresh water has an anesthetizing

effect because it leaches salt from the body fluids. The crustacean will die "quickly and easily without showing distress" as the water is warmed, he said.

As a further kindness, Dr. Gunter reported in *Science*, 133:327, 1961, the crab can be placed in a wire basket submerged in the water. This keeps him from burning his legs on the bottom of the pot.

"Anyone who watches the violent reactions of crabs being scalded to death can see they suffer extreme pain," he said, "and fishery marketing agents have pointed out that thousands of American housewives will not cook fresh lobsters or crabs because of that fact."

Crabs and lobsters generally are sold alive as a guarantee that the animal is unspoiled. The killing is left for the cook or the commercial canner.

"There is a false idea in some quarters that crabs are not good unless they are scalded to death suddenly," Dr. Gunter said.

Using his procedure, as soon as the lobsters or crabs are dead, the heat can be turned up and the water boiled quickly. The meat of the crabs or lobsters will be as good as that of animals scalded to death.

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TECHNOLOGY

Thermoelectric Device Will Heat or Freeze

► A TINY THERMOELECTRIC device that can boil or freeze a drop of water using the power from two flashlight batteries has been developed by Hughes Aircraft Company.

The device, which is smaller than a paper clip, heats at the junction of two special semiconductor materials when a current is passed through it. It cools when the direction of the current flow is reversed by flipping a switch.

In clusters, its use could range from maintaining room temperature in a space ship to operating an instant-defrosting refrigerator with no moving parts.

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WILL BOIL OR FREEZE WATER

ANTHROPOLOGY

Art Reflects Society

► AN ARTIST who shows a preoccupation for rounded female shapes in his art reflects an interest of his society in women.

Dr. J. L. Fischer of Tulane University, New Orleans, found that art may serve as a map to understanding the society in which the artist lives.

Designs that repeat a number of simple patterns indicate the society is equalitarian, with the same right for all individuals, he reported in the *American Anthropologist*, 63:79, 1961. Designs using a number of unlike patterns or shapes indicate the artist lived in a society with a type of hierarchy, or class differences.

These conclusions are based on the assumption that the artist is expressing a "social fantasy." The artist fantasizes and expresses social situations that will give him security or pleasure.

Dr. Fischer used two tests, one on pictorial arts and one on social variables, to arrive at his conclusions. He said that the successful artist has a greater ability to express the personality common to his society than his own private personality since most societies have fairly strict social and traditional controls on art production.

INVENTION

Patents of the Week

An anti-smog device, reducing air pollution and making the car more efficient, a system for dispelling fog on airstrips and a cleansing solution for surgeons have been patented.

► THE IRRITATING BLANKET of smog formed over large cities may soon be a thing of the past. A new anti-smog device not only reduces air pollution caused by automobile exhaust gases, but it also increases the car's efficiency.

According to the inventor, Joseph S. Falzone of Old Bethpage, N. Y., virtually 50% of the gasoline hydrocarbons, which eventually pollute the atmosphere, are not used in the engine. By rerouting the unburned gases back to the engine, the smog-forming chemicals are considerably reduced.

A filter, inserted in the exhaust pipe, stops the exhaust gases, and the gases are recirculated back to the carburetor by a whirling device. An air tank, attached to recirculating system, can add alcohol to the fuel mixture, preventing icing of the fuel line. For the last 18 months the inventor has been testing the device, patent No. 2,969,782, with good results on his own car.

Although the filter was not removed during the entire trial, Mr. Falzone recommended it be cleaned once every three months in normal car use.

Dangerous soupy fog rolling in across airport runways causes hazardous conditions and prevents airplanes from landing or taking off. Robert Giannoni of

He added that personal isolation of the artist and encouragement of individual expression to the degree known in modern Western society were not found in the societies studied.

Dr. Fischer found that design with large amount of empty or irrelevant space characterized equalitarian societies whereas designs with little empty space were found in hierarchical societies. Symmetrical designs were found mostly in equalitarian societies and asymmetrical design in hierarchical societies.

Another theory that there is a relationship between form of marriage and art styles was supported by the studies made. Societies where one man may marry two or more women had more curved, or female, designs than societies where a man may only marry one woman, in which straight-line designs were more prevalent.

One of the most promising possibilities of the study of art styles as related to social conditions is its application to extinct cultures of which art works have survived but no knowledge of the people who produced them.

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than the time-honored scrubbing technique, the inventor said.

Much valuable time, which is very important to a surgeon, is saved by using the ultrasonic cleaning method.

The patent rights of the invention, No. 2,970,073, were assigned to Howe Sound Company.

A guard rail installed at school intersections will provide more safety for schoolchildren crossing the street. The spring-operated gate, patent No. 2,969,604, prevents impulsive children from spilling out onto the street despite moving traffic.

Inventor Mutual Burton Sr. of Columbus, Ohio, believes the possibility of human error when employing patrol boys or adults at school intersections is eliminated by the mechanical safeguard.

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DENTISTRY

Chemical for Tooth Decay

► WITHIN THE NEXT YEAR a harmless chemical solution may surpass sodium fluoride, now being used as a direct application to prevent the decay of teeth. But once decay becomes visible, nothing so far has been found to make drills and fillings obsolete.

Dr. Ward Pigman, one of three biochemists at the University of Alabama Medical Center, Birmingham, reporting work on tooth hardening, told SCIENCE SERVICE that their research has advanced from years of test tube experiment to testing in the human mouth.

"We are working now with a couple of companies on research that we hope will soon result in practical use of chemical solutions in preventing tooth decay," Dr. Pigman said.

But the most to be expected from the application of secondary calcium phosphate dihydrate or synthetic hydroxyapatite, the chemicals being tried experimentally, is that the beginning invisible stages of decay will be discovered in time to prevent further damage.

The limit of softening before repair can be done through natural recalcification of enamel has been the subject of research by many scientists. The Alabama biochemists believe they have discovered this point, the 150 Knoop hardness number.

"The surface enamel of teeth is constantly being formed and reformed," Dr. Pigman said, "and we hope the equilibrium of the

oral fluids affecting decay can be kept positive by application of the proper chemicals."

The Alabama experiment showed that fluoride in minute proportions added to the synthetic hydroxyapatite hastened the return to original hardness of tooth enamel in test tubes. But direct application of sodium fluoride alone has not been the complete answer, Dr. Pigman said, since it has only reduced decay 20% to 30%.

Drs. Theodore Koulourides and Heriberto Cueto are the two other biochemists at the University of Alabama with whom Dr. Pigman has been working.

Commenting on the work of the Alabama trio, Dr. David B. Scott of the Na-

PUBLIC HEALTH

Alaskan TB Declines

► THE ANNUAL tuberculosis infection rate for native Alaskans has dropped from 24.6% in 1949-51 to 1.1% in 1960, a survey has shown.

Improved standards of living along with case-finding, isolation and treatment with the drug isoniazid may spell an end to the tuberculosis epidemic that has plagued Alaskan residents since the beginning of the twentieth century.

Drs. George W. Comstock and Robert

National Institute of Dental Research, National Institutes of Health, said research of several years had shown tooth surfaces "are not as inert as we used to think," and that if a very small amount of mineral should be lost, it is conceivable it might be returned.

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MEDICINE

Heart Research Program Biggest Ever Planned

► THE AMERICAN Heart Association will conduct a \$10,000,000 research program for 1961-62, the largest in its 13-year history.

Awards of more than \$2,000,000 in fellowships to 179 scientists for heart disease studies will become effective July 1.

The scientists will study in 26 states, the District of Columbia and four foreign countries.

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THE FAT AND THE LEAN OF IT—A device, the Sonoray, developed by Branson Instruments, Inc., Stamford, Conn., locates layers of fat and lean by bouncing harmless sound waves into the animal's tissue. It was used at the 52nd International Livestock Exposition to prejudge the quality of beef.

N. Philip of the U. S. Public Health Service said the reduction was so "dramatic" that children whose parents were killed by the disease may live to see tuberculosis become rare.

More than 6,000 native inhabitants of the Yukon and Kuskokwim delta, where the tuberculosis problem has been most serious, are taking part in trials of isoniazid treatment by the Public Health Service. Aim of the trials is to see if a method for reducing the risk of the disease among infected persons can be found.

The first systematic examination of Alaskan natives for tuberculosis, conducted from 1948 to 1951, showed 75% of the children examined reacting positively to TB tests. This percentage, the investigators reported in the current Public Health Reports, 76:19, 1961, revealed a situation in the Yukon-Kuskokwim delta "with few rivals in medical literature."

The disease probably was introduced to Alaska by white visitors and immigrants, coming first to the Aleutian Islands. Brought first to the southern coast and southeastern panhandle by explorers and fur traders in the latter part of the 18th century, tuberculosis was probably introduced into the interior along the northwest coast late in the 19th century by seekers of gold and whales.

The Yukon-Kuskokwim delta is a roughly triangular area, with the Bering Sea on the southwest. About 7,000 Eskimos and fewer than 1,000 white people live in the area of about 30,000 square miles, which makes it the area of densest population of Alaskan natives. It includes 41 villages ranging in size from 30 to 1,000 persons.

Dr. Comstock is chief of epidemiological studies, tuberculosis branch, Washington, D. C., and Dr. Philip is chief, epidemiology section, Arctic Health Research Center, Alaska.

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GENERAL SCIENCE

Defense and State Partners

► THE DEPARTMENTS of Defense and State will be close partners in the Kennedy Administration. Secretary of Defense Robert S. McNamara made this known at his first Pentagon news conference.

A closer daily working relationship between these two departments has been suggested to advance the goal of national security.

Arms control, nuclear disarmament and arrangements to cooperate in space exploration are some of the important problems involving the national security in which both Departments are individually involved.

Secretary McNamara and Secretary of State Dean Rusk already have set in motion a pattern of operation that would involve joint efforts and close contact at all staff levels.

The Defense Secretary also announced plans to increase the United States' military airlift transport capacity by adding 53 cargo carriers, 30 Boeing C-135 jet transports and

23 turbo-jet C-130Es by Lockheed, at a total cost of \$170 million.

Delivery of the first jets is scheduled for July of this year, four years ahead of previous plans under former President Eisenhower.

The program for SAMOS satellite will continue, Secretary McNamara said. He denied that the purpose of this Air Force satellite was limited to photo reconnaissance of military installations over foreign territory.

The SAMOS is a multi-purpose vehicle, he said, and is not at all like the U-2 high-altitude spy plane. The program for SAMOS still is in the early development stage. Some of the information expected from SAMOS and other military satellites will be of non-military scientific benefit. Such non-military information will be shared with other nations, Secretary McNamara said.

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ASTRONOMY

Comet's Head and Tail

► A COMET confusing head and tail is now roaming nearby skies.

Dr. Elizabeth Roemer, astronomer of the U. S. Naval Observatory, Flagstaff, Ariz., reported that the coma (haze around the comet's center and part of its head), which generally blends into the tail of a comet, is almost on the opposite side of the tail in Encke's comet.

This comet, which reappears near the sun every three and a third years, was observed at Flagstaff until it went too low on the horizon to study in the Northern Hemisphere.

Dr. Roemer said the displacement of the coma in relation to the tail was "a very interesting feature" seldom seen in comets. She said it could possibly be that the coma and tail merely appear to be opposite because of the angle from which the comet is viewed from earth.

The comet's tail continued to get brighter and longer during the time it was observed.

When last photographed, the tail was more than two degrees long.

Although the comet is now very close to the sun, it will reappear in March for observation in the Northern Hemisphere.

A peculiarity of Encke's comet is its "on again-off again" acceleration. It has been observed to speed up for no accountable reason and no precise calculations of the acceleration have been made so far, Dr. Roemer said.

Dr. Fred L. Whipple, director of the Smithsonian Astrophysical Observatory, Cambridge, Mass., has proposed that the comet's acceleration is due to a jet stream shooting out from its rotating center.

Dr. Roemer said she did not know whether this jet is large enough to account for the comet's acceleration, or if acceleration exists at the present time. However, she expects more knowledge of the acceleration may result from data gathered by May.

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PHYSICS

Scientists in Politics

► AN ACTIVE ROLE for scientists in aiding wise political decisions is urged by Dr. Hans A. Bethe of Cornell University, originator of the theory of how the sun is stoked automatically.

"Very frequently when a problem comes up for public discussion and Government decision, scientists have lived with it already for many years," Dr. Bethe told the American Physical Society meeting in New York in a principal address. "Some of them at least will have thought more deeply about

the political implications than the politicians who now have to make the decision."

The final decision rests with the Government officials, he said, but the voices of scientists should be attentively heard before the decision is made.

Dr. Bethe urged that informed public opinion have an influence in Government decisions. He recognized that some scientific developments must be guarded by secrecy, but scoffed at the notion that the

public cannot be made to understand the technical nature of the information.

"Actually, the essential pieces of information are usually nontechnical and could easily be understood by the public," he said.

He disagreed with scientists and laymen who hold the view that social responsibility should override all other considerations.

"They claim that if scientists had refused to work on the atomic bomb, this weapon would not exist and the world would be much better off," Dr. Bethe said. "The view is commendable, but in my opinion, Utopian. . . . It also seems to be unethical."

Once a decision is reached, it is up to the scientific community to cooperate, he said. However, the scientific community can do much in formulating wise political policies.

Other qualifications which he believed scientists can effectively offer the political sector included:

1. Analytical training. Scientists and lawyers share the ability to analyze a problem and reach a conclusion.

2. A feeling for numbers. Dr. Bethe considered this another ability placing the scientists high on the list of those who are qualified to make Government decisions.

3. International understanding. Scientists have long cooperated in a common pursuit for knowledge, and Dr. Bethe termed this "a good way to bring people from different countries together in mutual admiration and respect."

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Structure of Proton

► NEW INSIGHTS into the structure of the proton, the core of an atom of hydrogen, have been reported by Dr. Robert R. Wilson of Cornell University.

The proton has been scrutinized by the Cornell electron synchrotron which now produces an intense beam of electrons of more than 1,000 Mev (million electron volts) of energy.

In a sense, Dr. Wilson said at the American Physical Society meeting in New York, the synchrotron is being used as a microscope which allows an indirect insight into the proton.

The beam of electrons is directed onto a target containing hydrogen. This causes collisions between the electrons and protons, and the electrons become scattered. The amount of scattering can be counted and then related to the electromagnetic structure of the proton.

For instance, the researchers assume a particular model for the proton in which the charge is centered in one spot. They can compute the amount of scatter for this model, and compare the results with the actual scatter of electrons when the synchrotron is used.

The Cornell scientist has constructed a model which seems to be a fair duplication of the actual proton structure.

Dr. Wilson explained that the proton appears to have a core that contains about half the charge, and around this core is a cloud containing the rest of the charge.

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PHYSICS

Radiation From Earth

► ATOMIC RADIATION circling the earth that has caused some concern for space travelers comes from the earth's atmosphere.

Experiments reported to the American Physical Society in New York show that the inner Van Allen radiation belt is made up of the decay products of cosmic-ray-created neutrons leaking out of the earth's atmosphere.

The information resulted from two experiments by Dr. Wilmot N. Hess of the University of California's Lawrence Radiation Laboratory, Livermore, Calif., in which neutron counters were sent aloft by the U.S. Air Force on Atlas rockets. One was launched early last year under normal conditions and another last November during one of the largest solar storms in recent history.

The first Atlas flight demonstrated that the actual number of neutrons leaking out of the earth's atmosphere agreed closely with theoretical calculations made by Dr. Hess and his colleagues to account for the inner belt's known characteristics.

During the November flight, neutron leakage was found to be more than twice the level of the first experiment, thus demonstrating a relationship between cosmic radiation and neutron production in the upper atmosphere.

The sequence of events leading to the placement of nuclear particles in the inner Van Allen belt starts with the approach toward earth of protons from the sun and other sources of cosmic radiation. Some of the protons strike oxygen or nitrogen nuclei in the atmosphere and knock out neutrons.

Part of the neutrons produced escape from the top of the atmosphere and travel out into space where they eventually decay into protons and electrons. Some of the charged particles are then trapped by the earth's magnetic field to form the radiation belt.

In both experiments, said Dr. Hess, the neutron count level was quite low near the ground and rose to a maximum at about 60,000 feet. At about 50 miles the rate had decreased to that at sea level, and at 600 miles the rate was only half the sea-level rate. The inner Van Allen belt is roughly 700 to 2,000 miles from the earth surface.

The physicist indicated that there are not enough neutrons at any altitude to injure potential space travelers. But if a manned space flight happened to coincide with a large solar storm, the incoming protons could present a greater hazard than traversal of the radiation belts.

Dr. Hess, in conjunction with physicists Charles Curry and Robert Henderson of the Livermore Laboratory, conceived the experiments and designed and built the neutron counters with the support of the U.S. Atomic Energy Commission. Design and fabrication of the telemetry system and the instrument package was performed by

personnel of the Air Force Special Weapons Center at Albuquerque, N. M.

For each flight a neutron counter and transmitter were mounted in a "pod" attached to the exterior of an Atlas rocket. The pod was released from the rocket in flight and data from the counter was radioed to the ground and recorded at several stations along the path of the rocket. The rockets were launched from Cape Canaveral, Fla., and traveled about 5,000 miles down range in the direction of Ascension Island, reaching a maximum altitude of about 800 miles.

Two more flights will be made this year to gather additional data and to study the energy distribution of the neutrons.

• Science News Letter, 79:103 February 18, 1961

Use Magnetic Fields

► PRACTICAL APPLICATIONS for superpowerful magnetic fields are being developed at the University of California's



DOUBLE PROP BLADES—A variable camber propeller uses tandem blades for varying flight conditions. The 15-foot diameter propeller, under development for the U.S. Navy at United Aircraft Corporation, Windsor Locks, Conn., will on vertical take-off and landing aircraft permit an increase of up to 50% in payload, or up to 40% in range. The propeller is now being tested.

Lawrence Radiation Laboratory and in a number of industrial research centers.

H. P. Furth of the Lawrence Laboratory reported that metal parts can be formed by magnetic-field pressure at the American Physical Society meeting in New York. Sheet metal can be pressed into dies by harnessing the power of the high magnetic fields. The field used in this particular metal-pressing process is somewhat lower than the million gauss range, which has an explosive effect on massive steel and bronze coils.

• Science News Letter, 79:103 February 18, 1961

Superconductors Studied

► PRACTICAL APPLICATIONS for the tunneling of electrons in superconductors are being studied in the General Electric Research Laboratory, Schenectady, N. Y.

The researchers, Drs. Ivar Giaever and Karl Megerle, reported to the American Physical Society in New York that this new phenomenon may be particularly useful in developing new types of computers.

A superconductor is a metal, such as lead, which will conduct current seemingly indefinitely when cooled close to absolute zero, which is 459.7 degrees below zero Fahrenheit.

The tunneling phenomenon occurs when two metal sheets are separated by an insulating layer that is only five to ten atoms thick. When a voltage difference is applied between the two metals, current will flow through the insulating film.

The power requirement is extremely low and the samples are potentially easy and cheap to mass produce, the researchers said.

• Science News Letter, 79:103 February 18, 1961

SOCIOLOGY

No Place for Elderly In Industrial Plants

► EARLY RETIREMENT will increasingly be the lot of most manual workers, a study by the Nuffield Foundation at Cowley, Oxford, England, has shown.

For many years government officials and physicians have advised older persons to continue working.

However, in industrial plants at least, it seems there is no place for the aging worker. No longer able to keep up the pace on the assembly line, and with but little alternative light employment available, he must get out. Automation will not help him.

Indeed, the introduction of the new technique "may have the result of inclining companies more generally to favor an arbitrary retiring age," a report on the study states.

By 1980, nearly one man in five in most civilized countries will be over 65. Many must retire and then spend 12 years or more in retired life. Most such men will be in good health, but will simply have grown too old for the job.

F. Le Gros Clark, who produced the report, based it on studies in eight highly mechanized plants.

• Science News Letter, 79:103 February 18, 1961

OCEANOGRAPHY

New Underwater Craft Designed

► A NEW UNDERWATER research craft may soon expose the secrets of the silent ocean depths.

Designed by the Swiss scientist, Jacques Piccard, the craft will open up new avenues of oceanographic research. Known as a mesosaph, which means middle boat in Greek, the vessel can move both horizontally and vertically in the ocean waters.

Mr. Piccard said that the mesosaph has many advantages over its predecessor, the bathyscaph. Besides its greater maneuverability, the mesosaph allows better visibility and has more speed. The craft can penetrate to depths three times greater than conventional submarines.

Swirling propellers drive the steel-clad craft through the ocean depths. The craft quickly surfaces merely by shutting off the motors, and the air-filled "underwater helicopter" bobs back up to the surface.

Although the mesosaph is still in the design stage, Mr. Piccard confidently believes the craft will be built in the near future, if enough funds are available. The bathyscaph, in which he and Navy Lt. Don Walsh submerged to record depths off the Philippine coast last year, was built entirely from voluntary contributions.

Mr. Piccard received an award in Washington, D. C., from Argosy magazine in recognition of his 1960 record-shattering feat. It was presented to him by Sen. Warren G. Magnuson (D-Wash), a leading advocate for a bill encouraging oceanographic research.

• Science News Letter, 79:104 February 18, 1961

OPHTHALMOLOGY

Trachoma Still Common In Southwest Indians

► TRACHOMA is still a common eye disease among Pueblo and Navaho Indians, surveys reported in the Journal of the American Medical Association, 175:405, 1961, have shown.

Drs. John C. Cobb, Albuquerque, N. M., and Chandler R. Dawson, San Francisco, U. S. Public Health Service, who made the study, state that overcrowding and inadequate water supplies probably enhance spread of the virus-caused infection in homes and schools.

About 15% of 2,522 Pueblo Indians and 23% of 1,126 Navaho school children seen had the disease. Once the most common cause of blindness, trachoma can now be controlled by sulfonamide and antibiotics.

The division of Indian health of PHS is engaged in a control program of health education, early diagnosis and treatment of active cases.

Physicians will also be reading in their official journal that a new acetic acid solution (VosoL Otic) has produced "entirely satisfactory results" in 200 patients with "swimmer's ear," an inflammation of the outer ear caused by bacteria or fungi (p. 402).

Dr. Ben H. Jenkins, Newnan, Ga., who

SCIENCE NEWS LETTER for February 18, 1961

reports the findings, states the solution had several advantages over antibiotics and other drugs. Some drugs may suppress the symptoms without curing the infection, whereas the use of sulfonamides and antibiotics can be followed by development of resistant bacteria.

• Science News Letter, 79:104 February 18, 1961

ROCKETS AND MISSILES

Unfurling Techniques Promise Bigger Antennas

See Front Cover

► ONE OF THE GREATEST challenges in making unfurlable antennas for space vehicles is the development of techniques for folding and unfolding them.

These antennas, designed for operation in space, must be packaged in a small volume during vehicle launching and later automatically inflated in space.

New unfurling techniques are expected to make possible larger antennas than have been considered practical before. Using the pressure techniques, the antenna is inflated like a balloon. The Mylar and aluminum foil antenna balloon, seen on the cover of this week's SCIENCE NEWS LETTER, was designed by Lockheed Missiles and Space Division, Sunnyvale, Calif.

• Science News Letter, 79:104 February 18, 1961

MEDICINE

Bacteria Trigger Asthma In Persons With Colds

► PERSONS WHO GET "a dollar's worth of asthma for every nickel's worth of a cold" suffer an allergic reaction to ever-present bacteria that run wild when a cold strikes.

Dr. Stanley F. Hampton, director of the allergy clinic at Washington University School of Medicine, St. Louis, Mo., told specialists attending the American Academy of Allergy in Washington, D. C., that what they have suspected for some time is true: Cold-associated asthma attacks are, in many cases, a true allergy to an organism.

For the first real test of this theory, Dr. Hampton chose a bacterium, *Neisseria catarrhalis*, that inhabits the noses and throats of most persons, but usually causes no trouble. Large quantities of this organism were grown, jiggled to pieces with sound waves and filtered. The filtrates, containing bacterial antigens, were sprayed into the respiratory tracts of patients susceptible to the cold-asthma phenomenon. In most of the 16 patients, asthma attacks occurred within three to 30 minutes. All but two had an attack within six to eight hours. No attacks occurred in the controls.

The reason the allergy and the asthma come to the fore only when a cold strikes, Dr. Hampton believes, is that the bacteria are normally not present in large enough quantities. The excess moisture and associated conditions produced by the cold virus, however, probably cause a drastic upsurge in growth of the bacteria. More bacteria mean more reaction—the asthmatic attack.

• Science News Letter, 79:104 February 18, 1961

IN SCIENCE

GENERAL SCIENCE

Top Young Scientists Plan Future Careers

► THE PROSPECT of dedicating a lifetime to learning and working in the scientific disciplines is intensely appealing to the young Americans best qualified to become the productive scientists of the future.

Physics, medicine and teaching top the list of future careers planned by the year's most promising teen-aged scientists, the 399 members of the recently announced Honors Group of the Science Talent Search.

One-fifth of the group, 80 of them, look forward to joining the ranks of the nation's physicists. Five of these 80 future physicists are girls.

The medical sciences have attracted 17% of these outstanding high school seniors, with 47 boys and 21 girls planning on medical practice or research in medicine.

The grave problem of where to find top quality teachers may be brightened by the news that 12% want to teach. It is especially heartening to know that these future high school and college teachers include twice as many boys as girls, 34 boys and 15 girls.

The biological sciences have claimed the interest of 9% of the group, and engineering specialties another 9%. Chemistry comes next with 8%, followed by mathematics and computer science with 6% and general or interdisciplinary research with 6% also.

Other fields that can look forward to some new recruits include philosophy, sociology and anthropology, architecture and nursing. One young man thinks business administration will be his forte. Four of the Honors Group are deferring any decision on career training.

The annual Science Talent Search is conducted by Science Clubs of America (SCIENCE SERVICE) and is supported by the Westinghouse Educational Foundation.

• Science News Letter, 79:104 February 18, 1961

MINERALOGY

U. S. Mineral Production Leads Communist Bloc

► THE UNITED STATES and the Free World held a commanding lead in mineral production for 1959, the U. S. Bureau of Mines reported. The U. S. still leads the world in producing 21 important mineral commodities, whereas the Communist countries lead in only 10.

Although the Communist gains were less impressive than in previous years, the Sino-Soviet bloc did make substantial advances when compared with the 1953 production record. The large gains in the Communist sector were in the heavy industries.

• Science News Letter, 79:104 February 18, 1961

ENE FIELDS

OCEANOGRAPHY

Oceanic "Inner Space" Research Spotlighted

► THE SPECTACULAR results achieved in the race to conquer outer space overshadow an unusual interest now generating in regard to "inner space"—the oceans.

The need for oceanographic research is continually being echoed by Congressional committees, the military and scientists. President Kennedy emphasized the need in both his Inaugural Address and State of the Union message.

Various reasons, both practical and scientific, have been given from different quarters on why the United States' scientists should study the ocean depths. Military men point out the vulnerability of the United States to marine attack, whereas scientists stress the ocean's rich resources and its effect on weather.

With the world's population continually mushrooming, man is now turning to the ocean to harvest its rich food crop. By learning more about the seas around us, the productivity and fertility of the sea may be increased.

The military and scientific results are difficult to separate because they are so interrelated, Jacques Picard, noted Swiss scientist, told a Senate committee in Washington, D. C. Some of the oceanographic data would definitely have military applications, he said.

He also pointed out that the Russians rate their ocean research second only to their space program in importance.

• *Science News Letter, 79:105 February 18, 1961*

PSYCHIATRY

Leadership Is Needed, Not Dependence on State

► THE INDIVIDUAL should be encouraged to do more for and by himself and not to depend on a paternalistic state, the American Group Psychotherapy Association, Inc., has been told.

Challenging the "proffered remedies" of Prof. J. Kenneth Galbraith, Harvard University economist who wrote *The Affluent Society*, Dr. Iago Galdston of the New York Academy of Medicine said group therapists can give needed leadership to make man's future secure.

Cultural world tensions, he said, are as common to the East as to the West, to the underdeveloped countries as to those that reputedly have reached the "Affluent State."

"Prof. Galbraith," he said, "has well described the richness and variety of our means. He also has shown how meanly we use our wealth."

But, Dr. Galdston said, "I do not entirely accept his proffered remedies. They would further extend individual dependence

upon the paternalistic state. . . . To my mind the things that count in the ultimate, must in the ultimate be worked for and attained by the individual."

Traditionally, he said, psychiatry is concerned with the psychic conflicts of the individual, not with his cultural environment.

In insisting that psychoanalysis offers no world view or philosophy, Freud was right, Dr. Galdston said. But psychoanalysts cannot be indifferent to how much the cultural climate affects for good and ill the mental and emotional life of all whom it embraces.

Those involved in group therapy, he said, are even more favorably placed to give needed leadership than are the other members of the psychiatric brotherhood.

• *Science News Letter, 79:105 February 18, 1961*

ROCKETS AND MISSILES

Seven-ton Sputnik V Soars in Low Orbit

► A HEAVYWEIGHT Sputnik V satellite, weighing 7.1 tons, has been launched to test a new multi-stage rocket. Radio telemetry and trajectory tracking equipment is reported to be operating, by the Soviet Embassy in Washington, D. C.

According to American satellite experts, the orbit of a satellite only 138.75 miles from earth at its closest would change rapidly. Its estimated lifetime is about a week before it gets pulled into a circular orbit at this close distance and then passes into the earth's atmosphere where it will burn up.

The National Space Surveillance Control Center at Bedford, Mass., is tracking the satellite. Its 100 stations are receiving information, the nature of which has not yet been made public.

The radio signals are being monitored at about 20 megacycles, the wide-band frequency generally used by the Soviets.

The National Aeronautics and Space Administration's Minitrack stations have also been alerted. Only one signal has been picked up on the 20-megacycle band, a NASA official said. The station at East Grand Forks, Minn., "heard something." But what came over was neither loud nor clear enough either to verify or refute reports from Italian radio monitors who claim they heard human groans and code-like signals.

• *Science News Letter, 79:105 February 18, 1961*

TECHNOLOGY

Nuclear Power Plant Slated for Antarctica

► THE FIRST NUCLEAR power plant in Antarctica will begin operating in March, 1962.

The plant, built by the Nuclear Division of the Martin Company, will be shipped next November from the United States to McMurdo Sound for installation, J. Donald Rauth, general manager of the Nuclear Division, reported. It will be the first permanent structure built on the Antarctic continent.

• *Science News Letter, 79:105 February 18, 1961*

METEOROLOGY

Weather Forecasting Aided by Satellite

► STORMS CAN NOW be forecast much quicker from pictures taken by weather satellites.

Cloud formations that show certain patterns when a storm begins are clearly indicated in photographs taken from *Tiros I*, U. S. Weather Bureau meteorologist Vincent J. Oliver told the American Meteorological Society meeting in New York. The cloud formations, or cyclonic patterns, are tracked over large areas by the weather satellite.

The photographs from weather satellites fill a gap in the weatherman's knowledge of weather forecasting, the scientist said. For the last 30 to 40 years, scientists have been searching for ways of observing storms in their entirety.

Prior to *Tiros I*, surface and airplane observations provided very localized or patchy information of storm patterns. With the photographs from *Tiros I* and its successor *Tiros II*, scientists can now confirm many of their ideas about the formation of storms.

Mr. Oliver predicted that the first operational weather satellite will be transmitting weather information sometime in 1962. This satellite will be part of a scheduled world-wide satellite network for weather forecasting.

The satellite will house more sophisticated instruments than those in *Tiros I* and *II*. Besides a better and bigger TV camera, the new satellite will also contain infrared cameras capable of transmitting information back to earth immediately, 24 hours a day. Information from the infrared cameras now used takes three to four months before scientists can analyze the data.

Tiros III, the third and last of the experimental weather satellites, will be launched this year. *Tiros I* and its sister satellite, *Tiros II*, served as test vehicles for the future weather satellite network, according to the meteorologist.

• *Science News Letter, 79:105 February 18, 1961*

TECHNOLOGY

Revolutionary Compact Transformer Developed

► A TRANSFORMER design may revolutionize the distribution of electric power to the nation's consumers.

Developed by General Electric, the new unit is the first distribution transformer designed in 75 years that does not use oil in significant quantities for cooling and insulating.

By eliminating this fire hazard, the transformer can be mounted on a house or garage wall. The unit can also be buried in the ground or used in mines where moisture and other similar problems are constant threats.

The new transformer will replace the bulky ones now attached to pole tops. Trial units will be installed in selected homes throughout the country this year.

• *Science News Letter, 79:105 February 18, 1961*

MEDICINE

Cholesterol, Accused Killer

Intensive research is under way to determine whether or not the fatty substance, cholesterol, is responsible for hardening of the arteries, Faye Marley reports.

► IT HAS COME to the point where one is afraid to eat eggs for breakfast or butter a roll for dinner, much less drink a glass of whole milk at bedtime. Why? Because cholesterol is found in animal fats and eggs. And because cholesterol is suspected of causing atherosclerosis, the narrowing or closing of the arteries leading to coronary attack.

And it may be true. Only research on a larger scale than has been attempted so far will answer the question.

Dr. Irvine H. Page, director of research at the Cleveland Clinic Foundation, a former president of the American Heart Association, has a \$50,000 grant from the National Heart Institute of the U. S. Public Health Service to make plans for a major diet study to learn if there is a decline in atherosclerosis after a reduction in the cholesterol level of the blood. This may involve studying thousands of persons, in their home environment.

Role of Cholesterol Studied

The National Heart Institute for the fiscal year 1960 granted approximately \$1,300,000 in support of research projects primarily concerned with the relation of nutrition to arteriosclerosis, the large majority of which is in atherosclerotic form. Cholesterol is included in the nutritional studies.

Also granted during the same period by NHI was approximately \$1,500,000 for biochemistry studies that will include some phases of cholesterol and its metabolism.

Among the numerous researchers interested in the cholesterol relationship to atherosclerosis is Dr. Weldon J. Walker, chief of cardiology, Walter Reed Army Medical Center in Washington.

Dr. Walker, with others at Harvard Medical School and Peter Bent Brigham Hospital, Boston, Mass., has studied the effect of weight reduction and caloric balance on serum lipoprotein and cholesterol levels. He hopes to do further research along these lines.

In an interview, Dr. Walker said there are obviously other factors besides high cholesterol levels in the blood that are causing so many cases of coronary atherosclerosis. Blood clotting ability may be at fault, for example.

"In population studies throughout the world, however," Dr. Walker said, "among the middle-aged whose average serum cholesterol level is over 220 milligrams, the death rate is high. Where the average serum cholesterol is under 200 milligrams it is low."

Dr. Walker said some of the principal evidence linking atherosclerosis with altered cholesterol metabolism has been in the

results of feeding laboratory animals cholesterol and following other dietary procedures with them.

"Experimental lesions produced in this way," he said, "are always preceded by an elevation of serum cholesterol and the lesions themselves have a high cholesterol content."

An increased incidence of atherosclerosis has been observed in diseases associated with hypercholesterolemia (an excess of cholesterol in the blood) such as xanthoma, tuberosum, myxedema, diabetes and nephrosis. Individuals who suffer coronary thrombosis, or myocardial infarction, early in life tend to have higher levels of serum cholesterol and lipoproteins than the general population.

There is no evidence, however, that dietary cholesterol elevates serum lipid levels or causes atherosclerosis in humans, he said. The total circulating cholesterol in humans is largely endogenous, originating with the organism.

Dr. Walker said that weight reduction has been shown to lower cholesterol and that fat persons have a higher death rate than thin people. Insurance policy holders who are so fat that they must have sub-standard policies have lost weight and consequently reduced their death rate.

"Since heart attacks were recognized as coronary thrombosis some 50 years ago," he said, "the Metropolitan Insurance Company has paid out 50 times as much for this disease as it did for tuberculosis 50 years ago when TB was the leading cause of death."

There is apparently a protective quality for women in their hormones before meno-



STRESS TEST—The effect of going up and down stairs is being recorded by electrocardiograph in a series of stress tests at Walter Reed Army Medical Center. The simulated heart patient is Michael Benyak and the physician is Capt. Robert S. Capper.



FATTY DEPOSITS — Circling an artery are deposits of cholesterol, the fatty substance suspected of causing coronary atherosclerosis, one of the leading causes of death. If unchecked, thickening of arteries advances until there is no room for blood to circulate.

pause or hysterectomy, so that atherosclerosis is rare among them.

Almost universally among adult American males, Dr. Walker said, latent atherosclerosis exists without symptoms. A study of American soldiers killed in Korea showed 77% had demonstrable coronary sclerosis. "More persons die from coronary atherosclerosis," he said, "than from all forms of cancer. It is like rust in the fuel lines of an automobile. Ordinarily a heart attack is either caused by a clot forming on top of the atheromatous plaque, largely made up of cholesterol, or by coronary thrombosis, formation of a clot in a branch of the coronary arteries that supply blood to the heart muscle, resulting in obstruction of the artery."

Dr. Walker believes that there is no point in getting cholesterol tests inasmuch as the count varies from hour to hour, and its level in the blood might be up as much as 100 points the next day. He considers the important thing is to maintain the weight at a lean level.

To keep cholesterol to a minimum, Dr. Walker advises drinking skim milk or buttermilk, which have most of the vitamins and minerals of whole milk without the animal fat and contain half the calories.

He himself eats no butter, advises corn oil as cheaper than safflower oil for use in preparing mayonnaise and says with a bit of salt such oils are a satisfactory substitute for butter on toast. Eggs should be poached or boiled, he said, and fried foods should not be encouraged.

Even patients with peptic ulcer, he advised, will "do just as well on a high-protein Sippy mixture made from skim milk, skim milk powder, egg white and flavoring," as on the conventional high fat program. The amphoteric action (combining with both acids and bases) of proteins makes them especially effective in neutralizing gastric acidity.

In general it is wise to avoid saturated fats, which include butter, whole milk,

most cheeses (except cottage cheese), ice cream, shortenings and conventional margarines.

A saturated fat is one containing a full complement of hydrogen atoms along the carbon chain that forms the backbone of the fat molecule. If the chain is lacking one pair of hydrogen atoms, the fat is called monounsaturated. The main fat of this type, oleic acid, constitutes about 80% of the fat in olive oil. Oleic acid seems to be "neutral" in its effect on serum cholesterol, although some experts believe it may cause a slight elevation.

The oils shown to have the greatest cholesterol-lowering effects are the polyunsaturated fatty acids, which are lacking two or more pairs of hydrogen atoms. The most abundant is linoleic acid, which constitutes 40% to 55% of corn, soybean and cottonseed oils. Because linoleic acid cannot be manufactured by the body and is probably a necessary nutrient, at least for infants, it is often called an essential fatty acid.

The American Heart Association, which observes February as American Heart Month, has recommended through its Central Committee for Medical and Community Program a reduced fat consumption.

"Based on the best scientific information available at the present time," the Committee advises reasonable substitution of vegetable oils and other unsaturated fats for animal fats in the diet as a possible means of preventing atherosclerosis and lessening the risk of heart attacks and strokes.

The Committee urged, however, that medical guidance be sought before individuals make specific changes in the fat content of their diet, saying that fat reduction is probably of greatest potential benefit to these three groups:

Those who are overweight, those who have already had a heart attack or stroke, and men whose personal and family histories suggest that they may be particularly susceptible to atherosclerosis.

* Science News Letter, 79:106 February 18, 1961

Do You Know

More than 74,000,000 motor vehicles were driven on U.S. roads in 1960.

There are more than 108 ethnic groups living in the USSR, the 1959 census shows.

When Americans go to market, they can choose from as many as 5,000 different foods.

About 265,000 Americans died of cancer in 1960.

More than three and a half billion barrels of petroleum products were used in the United States in 1960.

Twenty-five billion packs of cigarettes are sold each year in the U.S.

* Science News Letter, 79:107 February 18, 1961

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Books of the Week

For the editorial information of our readers, books received for review are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D.C.

ADAPTIVE CONTROL PROCESSES: A Guided Tour—Richard Bellman—Princeton Univ. Press, 255 p., \$6.50. Presents a unified approach to the modern field of control theory and provides technique for making problems involving deterministic, stochastic and adaptive processes amenable to machine solution.

ADAPTIVE CONTROL SYSTEMS: Eli Mishkin and Ludwig Braun, Jr., Eds.—McGraw, 533 p., \$16.50. Reports on recent advances in feedback control systems, with special emphasis on adaptive control systems.

CALCULUS OF VARIATIONS: A. R. Forsyth—Dover, 656 p., paper, \$2.95. Unabridged reprint of last English translation.

THE CELL NUCLEUS: Proceedings of the 1959 Meeting held at the University of Cambridge by the Faraday Society—J. S. Mitchell, Chmn.—Academic, 269 p., illus., \$11. Deals with the molecular architecture and the biochemistry of the nucleus without concern for practical applications.

THE CHANGING NATURE OF MAN: Introduction to a Historical Psychology (Metabetafica)—J. H. Van den Berg, transl. from Dutch by H. F. Croes—Norton, 252 p., \$4.50. Dutch psychiatrist discusses how the relationships between parents and children have changed in the last 400 years, why maturation has become delayed, and the social aspects of neuroses.

CHEMISTRY, Vol. I—Chemical Bond Approach Committee, Laurence E. Strong, Ed.—Chemical Bond Approach Project, 2nd ed., 278 p., illus., paper, \$2.50. Revised new course in introduc-

tory chemistry, using the concept of chemical bonds as central theme.

CHEMISTRY FOR THE SAFETY MAN: Bureau of Labor Standards—U. S. Dept. of Labor, Bull. 222, 25 p., paper, single copies free upon request direct to publisher, Washington 25, D.C. Helps understand hazards presented by commonly used materials.

THE CHEMISTRY OF LIGNIN: Supplement Volume Covering the Literature for the Years 1949-1958—Friedrich Emil Brauns and Dorothy Alexandra Brauns—Academic, 804 p., illus., \$18. A critical review of ten years of international publications in the field.

THE COIL OF LIFE: The Story of the Great Discoveries in the Life Sciences—Ruth Moore—Knopf, 426 p., illus. by Patricia M. Jackson, photographs, \$5.95. Describes for the layman the great discoveries of the last 200 years about tissues, cells, chromosomes and the "tiny coil of DNA."

DELINQUENT AND NEUROTIC CHILDREN: A Comparative Study—Ivy Bennett—Basic Bks., 532 p., \$10. Presents detailed psychological profiles of 100 boys and girls of both types studied during a three-year period at child guidance clinic.

THE FIRST 3000 YEARS: Ancient Civilizations of the Tigris, Euphrates and Nile River Valleys, and the Mediterranean Sea—C. B. Falls—Viking, 220 p., illus. by author, \$6. For young people.

FREE GRASS TO FENCES: The Montana Cattle Range Story—Robert H. Fletcher—Univ. Pubs., 236 p., illus. by Charles M. Russell, \$12. The history of the Montana cattle industry from the early days of the fur traders to the 1959 Convention of the Montana Stockgrowers Association in Miles City.

FUNDAMENTALS OF PSYCHOLOGY: The Psychology of Thinking—Ernest Harms, Ed.—N. Y. Acad. of Sciences, Annals, Vol. 91, Art. 1, 158 p., paper, \$3. Conference papers on theoretical aspects and developmental problems of the psychology of thinking, and on the measurement and the creativity of thinking.

GRADUATE EDUCATION IN THE UNITED STATES—Bernard Berelson—McGraw, 346 p., \$6.95. Reviews the history of graduate study since its establishment at Johns Hopkins in 1876, presents detailed data on graduate education now available and recommendations.

A HISTORY OF THE UNITED STATES WEATHER BUREAU—Donald R. Whitnah—Univ. of Ill. Press, 267 p., \$6. The story of public services provided by this governmental organization since its inception in 1870.

INTRODUCTORY ALGEBRA: A College Approach—Milton D. Eulenberg and Theodore S. Sunko—Wiley, 290 p., \$4.95. Written specifically for college students who lack adequate preparation for college algebra.

MAMMALS OF WISCONSIN—Hartley H. T. Jackson—Univ. of Wis. Press, 504 p., 374 illus. and photographs, \$12. Reference work, systematically arranged, with complete descriptions

of each of the 84 kinds of mammals found in Wisconsin.

THE MEDITERRANEAN LANDS—D. S. Walker—Wiley, 524 p., photographs, \$6.75. Deals with the geography and economics of the countries with a coastline on the Inland Sea, such as Spain, Portugal, Italy, North Africa, the Balkan Peninsula, Turkey, the Levant, Israel, Egypt and Libya.

MODERN CHEMICAL PROCESSES, Vol. VI: A Series of Articles Describing Chemical Manufacturing Plants—D. Gray Weaver and others—Reinhold, 126 p., illus., \$6. Describes 17 recently developed processes, such as chemicals from wood, and catalyst manufacture.

THE NECESSITY FOR CHOICE: Prospects of American Foreign Policy—Henry A. Kissinger—Harper, 370 p., \$5.50. Deals with the dilemma of deterrence, limited war, the problems of arms control, and negotiations.

NEW AND NONOFFICIAL DRUGS, 1961—Council on Drugs of the American Medical Association—Lippincott, 849 p., \$4. Description of drugs evaluated on the basis of available laboratory and clinical evidence.

NORTH AMERICAN TREES (Exclusive of Mexico and Tropical United States)—Richard J. Preston Jr.—Iowa State Univ. Press, 2nd rev. ed., 355 p., illus., \$4.50. Handbook designed for field use, treats 135 genera containing 568 species.

OPEN VISTAS: Philosophical Perspectives of Modern Science—Henry Margenau—Yale Univ. Press, 256 p., illus., \$5. Physicist discusses probability, relativity and faith—problems common to both philosophy and science—and suggests that the progressive dynamism of recent physical science, when translated into moral and social terms, means the same as the word democracy.

PLASMA PHYSICS—James E. Drummond—McGraw, 386 p., illus., \$12.50. Systematic treatment of some of the special areas in plasma physics, such as quantum plasma physics, detailed statistical mechanics of plasmas, and aerodynamic aspects of magnetohydrodynamics.

PREDICTOR OF PROGRESS: Selections from the Speeches of Charles F. Kettering—T. A. Boyd, Ed.—Dutton, 252 p., \$5. Composites of inspirational utterances from the hundreds of speeches delivered in the course of forty years by the famous engineer, scientist and pioneer of industry.

RA'IVAAVE: An Expedition to the Most Fascinating and Mysterious Island in Polynesia—Donald Marshall—Doubleday, 301 p., illus. by James Scott, photographs by author, \$4.95. Anthropologist describes present aspects of life in a native community, 400 miles from Tahiti.

RIVAL THEORIES OF COSMOLOGY: A Symposium and Discussion of Modern Theories of the Structure of the Universe—H. Bondi and others—Oxford Univ. Press, 64 p., photographs, \$2.25. Provides the general reader with an introduction to current theories concerning the physical universe.

SCANDINAVIAN RESEARCH GUIDE: Directory of Research Institutions Within Technology and Science Exclusive of Life Sciences, Vols. I and II—Scandinavian Council for Applied Research, 687 p., 486 p., paper, \$10 per set. Concise and detailed information on more than 1,500 research institutes, universities and scientific societies in Denmark, Finland, Iceland, Norway and Sweden.

SCIENCE AND COMMON SENSE—James B. Conant—Yale Univ. Press, 344 p., paper, \$1.45. Reprint of 1951 edition, with new preface by author.

SMITHSONIAN INSTITUTION: Annual Report 1959—Leonard Carmichael, Secretary—GPO, 693 p., illus., \$3.75. Includes articles on transuranium elements, solar radio astronomy, mirages, rhythmic nature of animals and plants,

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and on the three Neanderthal skeletons from Shanidar Cave.

SOURCE BOOK OF HEALTH INSURANCE DATA 1960—*Health Insurance Inst.*, 2nd. ed., 80 p., paper, 25¢ direct to publisher, 488 Madison Ave., New York 22, N.Y. Current statistics on commercial health insurance coverage.

SYNTHESIS OF HETEROCYCLIC COMPOUNDS, Vols. 3 and 4—A. L. Mndzhoian, Ed., transl. from Russian by A. E. Stubbs—*Consultants, Bur.*, 156 p., \$26. Contains laboratory methods for the preparation of 30 different compounds of furan derivatives and methods of preparing compounds of other heterocyclic series.

THINKING MACHINES: A Layman's Introduction to Logic, Boolean Algebra and Computers—Irvin Adler—*Day*, 189 p., diagrams by Ruth Adler, \$4. Explains for the layman the working of electronic computers.

TOOLS FOR THE ASTRONOMER—G. R. Miczaika and William M. Sinton—*Harvard Univ. Press*, 194 p., illus., \$7.75. Discusses modern instrumentation for collecting, recording and analyzing light: photography, telescope optics, construction of telescopes, spectroscopy, instruments for solar research and radio telescopes.

UNDERSTANDING ARITHMETIC—Maytscherl W. Beckles—*Prentice-Hall*, 372 p., illus., \$3.76. Features illustrative exercises to facilitate gradual understanding of meaning and relationships.

UNDERWATER ACOUSTICS HANDBOOK—Vernon M. Albers—*Pa. State Univ. Press*, 290 p., illus., \$10. Reference work on the physical characteristics of the ocean medium, the generation and detection of underwater sound and acoustic measurement techniques.

THE UNITED NATIONS AND HOW IT WORKS—David Cushman Coyle, introd. by Hernane Tavares de Sa—*New Am. Lib.*, rev. ed., 222 p., paper, 50¢. Objective analysis of UN structure, problems, operations and accomplishments.

THE UNITED STATES POLITICAL SYSTEM AND HOW IT WORKS—David Cushman Coyle—*New Am. Lib.*, 152 p., paper, 50¢. Reprint, discusses also effects of Science on the Federal Government.

VICTORY OVER SPACE—Albert Ducrocq, transl. by Oliver Stewart—*Little*, 264 p., illus., \$4.95. Background to the astronautic aims, and analysis of U.S. and Russian scientific achievements in space.

VISUAL SPACE PERCEPTION—William H. Ittelson—*Springer Pub. Co.*, 212 p., \$6. Systematic discussion of the theory of perception, the visual space cues and special problems in visual space perception.

WELLSPRINGS OF LIFE—Isaac Asimov—*Wheland-Schuman*, 238 p., illus., \$3.75; *New Am. Lib.*, 200 p., illus., paper, 50¢. The story of life on earth, in the species, in the cell and in the living molecules.

WONDERS OF INVENTIONS—Mary Graham Bonner—*Lantern Press*, 128 p., illus. by Carol Cobblewick, \$2.95. Tells young readers about some great inventions.

* Science News Letter, 79:108 February 18, 1961

Questions

GEOPHYSICS—By how many feet is the equatorial diameter longer from certain points? p. 99.

PUBLIC HEALTH—How many countries reported cases of smallpox in January? p. 98.

Photographs: Cover, Lockheed; p. 99, Hughes Aircraft Company; p. 101, Branson Instruments, Inc.; p. 103, United Aircraft Corporation; pp. 106 and 107, U.S. Army; p. 111, ECKO Products Co.

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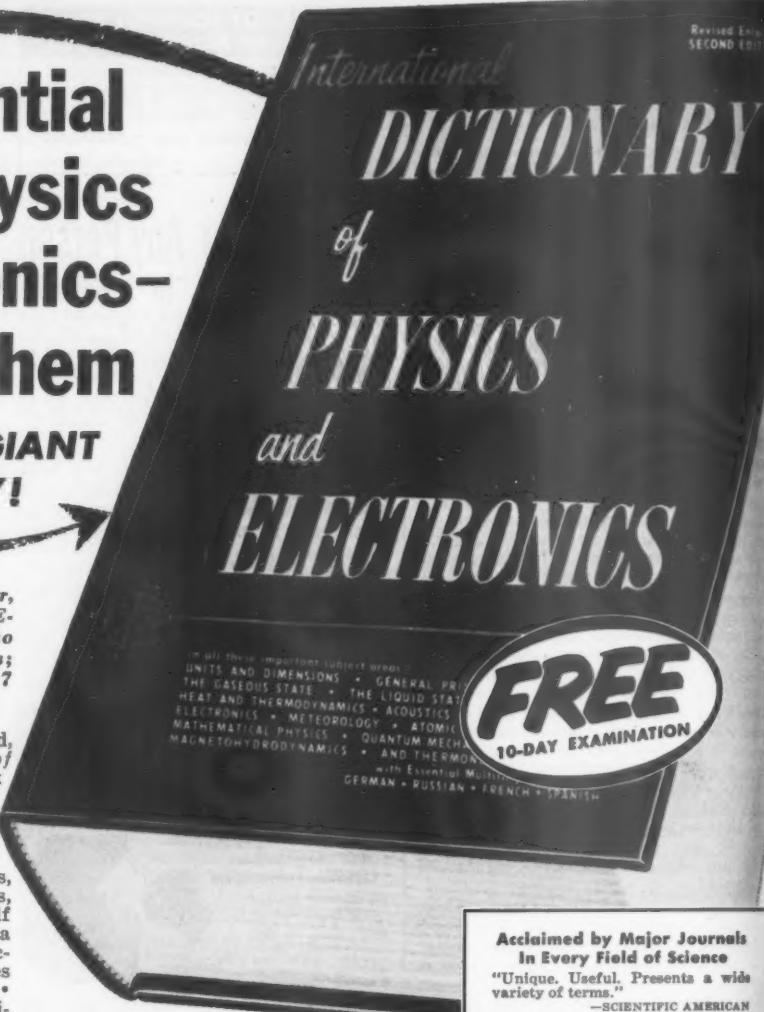
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• **ELECTRONIC LIGHT SWITCH** makes it possible to install a light or appliance switch wherever desired in about 15 minutes without damage to walls or ceilings. The control box of the do-it-yourself unit is plugged into a wall plug; the light or appliance to be operated is plugged into the control box; special tape connected to the control box is applied to the switch site. Touch the tape, the switch turns on. Another touch, it turns off.

• Science News Letter, 79:111 February 18, 1961

• **TROUSER HANGER** of durable, leather-textured plastic holds trousers securely by the cuffs and completely eliminates hanger marks. Ideal for travel as well as home use, the slim envelope-type hanger fits all suit-carrying luggage and is available in six colors.

• Science News Letter, 79:111 February 18, 1961

• **CAR TRAY** with automatic coin dispenser for parking meter or toll charges fits any dashboard and is designed to hold cigarettes, tissues, glasses, and also maps or memos. The dashboard tray is made of lightweight aluminum and simulated leather.

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• **EGG BEATER**, shown in the photograph, with rounded side handle provides a comfortable natural grip for effortless beating and is available in a deluxe model with



an exclusive hang-up hole in the handle for easy storage. Plastic crank handles in black or beige are elongated for firmer gripping and are heat resistant to withstand dishwashers.

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• **WINDOW SHEETING** of plastic applied to glassed window areas admits sunlight without glare and may be custom-cut to required size. To apply, merely wet

window, press sheeting against it, and squeegee out excess water. Sheet is washable, long-wearing, and resistant to moisture, mildew, oils, tearing and cracking. It is available in a variety of colors.

• Science News Letter, 79:111 February 18, 1961

• **RUST PREVENTIVE PAINT**, for use with new or rusted metal, provides a special protective enamel-like coating that will penetrate deep into metal pores. Available in 10 colors, the paint can be used alone or over a primer. It dries dust-free in one to two hours and enamel-hard overnight.

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• **THIN-LEAD PENCIL** holds lead .02 inch in diameter. The very thin leads wear down evenly, assuring crisp lines which never vary in width. Packaged in plastic, the .02-lead pencil comes with a 24-lead dispenser.

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• **POOL SANITIZER** kills algae, bacteria and fungi in swimming pools without irritating skin or eyes. A combination of fatty acid derivatives, the agent is effective in hard or soft water and is non-corrosive to pools and equipment. It also will assist in the removal of floating debris by holding it on the surface of water.

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Nature Ramblings

► IT HAS BEEN SUGGESTED that our national bird, the bald eagle, may not be an appropriate symbol for this country. He tends to be a bully, robbing ospreys and other birds of their hard earned food. Just now the bald eagle is having a hard time avoiding extinction, which is not exactly the symbolic picture we like to have of the nation.

Among nominations for a replacement for our national animal is the sturdy, individualistic catfish. Left alone, he is content to rest in peace with the world. Threatened, his awesome barbs come up and he is the living picture of defense. And after all, what could be more 100% American than a catfish?

The truth is that every continent in the world except frigid Antarctica can boast a population of catfish. For sheer quantity in kinds and numbers, however, South America must be ranked as the catfish capital of the world.

North America has only two families of fresh water catfish and another salt water group. There are no native catfishes in our Far West, although some have been artificially introduced. Africa has nine families with about 250 species. Europe and Asia have about that many families together but perhaps a smaller number of species.

South America, on the other hand, has 12 distinct families of catfishes, totaling



Viva El Catfish!

about 1,000 different species. This great diversity of catfish makes up half of the fresh water fishes found in all of South America.

The casual tourist probably would not recognize many of the South American catfishes as belonging to the same group he knows from our own muddy rivers. The tropical forms range in size from tiny to gigantic, and many resemble pictures of bony-plated, prehistoric fishes that swam the rivers and seas of millions of years ago.

One catfish of South American rivers is measured in feet and weighs in hundreds of pounds.

It is not necessary to go south of the border to see some of these catfishes. The beautiful little scavenger catfishes, so common in tropical fish aquaria, are South American.

—HORACE LOFTIN

• Science News Letter, 79:111 February 18, 1961

